WFDSS Fire Behavior Specialist Refresher

This document is a quick reference for Fire Behavior Specialists to review system enhancements, common problems and little known features to help you prepare for the upcoming season.

Sources for Help and Information:

- **Help:** WFDSS has an extensive Help system that can be viewed by selecting the help link in the upper right corner of any WFDSS screen (). You can find topics by perspective in the table of contents, alphabetically in the WFDSS Online Help index, or you can look for information using the search feature. The Help Content can be accessed at any time at *WFDSS Website> Related Resources >WFDSS User Documentation*.
- **Related Resources:** Several WFDSS related documents and references can be found under Related Resources, such as Section 508 Compliance, Glossary, WFDSS User Documentation, WFDSS Tools, Training, Quick Tips, Videos, White Papers, Fire Behavior, Historical Fire Data, Release Notes, Policy/Procedures. (*WFDSS Website>Related Resources)*
- **Training:** Scheduled training, videos, quick tips, how to PDFs and other elearning information can be found on the Training page *(WFDSS Website> Training).*
- **Common Errors while Using FSPro:** See Review of FSPro Analyses Completed in 2010: Common Analytical Issues. (See *WFDSS Website>Related Resources>Fire Behavior*)
- **S-495 Material:** The below link takes you to the S-495 Geospatial Fire Analysis, on-line distance learning materials. This material is a wealth of information, organized into self-paced lessons on geospatial fire modeling systems. Viewers can learn about, or brush up on various geospatial fire modeling systems.
  http://frames.nbii.gov/portal/server.pt?open=512&objID=212&&PageID=2840&mode=2&in_hi_userid=2&cached=true

WFDSS Enhancements:

WFDSS has undergone many changes; please refer to the WFDSS website > Latest Information (upper right) for specific release information. Some changes you might be interested in reviewing are listed below.

- **Help Icon:** The help icon () is now available on some of the Pop-Up Browser windows. Clicking the help icon brings up content associated with that specific page.
- **Spreadsheets:** You can now download many of the lists displayed in WFDSS to a spreadsheet. Look for the Spreadsheet Icon () in the upper left corner of lists that can be downloaded. (See *Help> Downloading WFDSS Data to a Spreadsheet*)
- **Camera Tool:** The Camera Tool icon () captures images of the maps currently shown on your screen. This tool is valuable for capturing and archiving analyses from your results screen when you want to add more features to the map such as fire perimeters or reference data such as roads, designated areas, critical habitat, etc. This image can then be imported in to your decision document to support the assessment, objectives, course of action, and rational. Note: This feature uses WFDSS Topos base layer only, as the image back ground.
- **Near-Term Fire Behavior (NTFB):** This feature is available to Fire Behavior Specialists and to Super Analysts. NTFB is best used for 1-5 day fire progression modeling, similar to FARSITE, it displays modeled fire growth over the specified time period. NTFB is an excellent tool for analysts to calibrate fire behavior runs, by modeling known (previous) fire spread under historic (recorded) wind and weather conditions. Because NTFB uses forecasted weather it can be used to forecast fire spread under a forecasted weather event. A Values Inventory is also available with NTFB. (See *Help> Fire Behavior Reference, WFDSS Near-Term Fire Behavior Analysis (NTFB)*)

- **My Home Page:** (My Home Tab) Your Home Page now displays your work for the last 7 days, making it easier to go directly to your tasks.
- **Map Layers:** Reference Map Layers are being added and updated continually. To view them in your map displays, turn them on in your *My Home* tab>*System Preferences*.
- **LANDFIRE Refresh 2008 v1.1.0:** Available currently for the Southeast, Pacific Northwest, Pacific Southwest, Southwest, South Central and North Central Geographic Areas. The Northeast Geographic Area should be available sometime in May and Alaska and Hawaii shortly thereafter. This version incorporates disturbances (fire, vegetation management, weather, insects and disease) and succession through 2008 and data gathered at calibration workshops. This version has canopy characteristics calibrated for use with either Finney (1998) or Scott and Reinhardt (2001) crown fire method, however calibration for final selected method should be based on local conditions. This version builds from previous versions and therefor replaces previous versions. (See *Help>LANDFIRE Refresh 2008 V1.1.0*)

Little known WFDSS features:

- **Values Inventory:** Did you know that a values inventory is populated based on the planning area drawn, or when a Short-Term Fire Behavior (STFB) or Near-Term Fire Behavior (NTFB) analysis is complete? Values Inventory uses structure and national infrastructure values or Unit Shape information to quantify the values. The Values Inventory differs from the Values at Risk, associated with FSPro. (See *Help> Obtaining a Values Inventory*.)
    - **Analyses Tab:** Select Analyses Results, click the down arrow to the right of the Short Term or Near Term Results to expand the information and select the Values Inventory. Values Inventory can also be accessed from the Results tab on the Analyses Results page under Analysis Details.

- **Values at Risk:** WFDSS Values at Risk combines FSPro outputs with structure and national infrastructure information to quantify the number, miles, or acres of specific values within each probability contour. No economic values are associated with these outputs. (See *Help> Identifying Values at Risk*.)
    - **Analyses Tab:** Select your FSPro Analyses>Results, click the down arrow to the right of the FSPro Results to expand the information and select the Values at Risk. Values at Risk can also be accessed from the Results tab on the Analyses Results page under Analysis Detail.

- **Smoke Dispersion:** Basic atmospheric smoke dispersion point forecasts can be obtained from the Info tab on the Situation page. This feature gives you forecasted smoke dispersion information at 3 hour intervals for the first 3 days and 6 hour interval for days 4 - 7. This data displays basic mixing height, transport wind information, ventilation rate, etc.
    - Air Quality Tools can be found on the *Menu* tab under Fire Related Links. Selecting the air quality tools link will take you to a web page containing a whole suite of air quality assessment tools.
- **Landscape Critique:** Available from the Landscape page, provides a downloadable file with graphic and raster image summary information on the composition of the selected landscape. This file can be helpful to determine if the modifications you made in Landscape Editor have changed the landscape the way you wanted before creating the landscape file. (See *Help>Downloading a Landscape Critique*)
- **Querying Map Screen:** The "i" tool can be used in any Map screen to query the map for LANDFIRE data. Clicking the "i" tool and then clicking anywhere on the map will bring up LANDFIRE information for that point in the left hand pane under the Info tab. You can access information on elevation, aspect, slope, fuel model as well as canopy characteristics. This is a

quick way to find information about the landscape without having to create a landscape file. (See *Help>Viewing the landscape for an Analysis*)

- **Creating a Landscape Mask using WFDSS Historical Fires:** A landscape mask can be created using WFDSS Historical Fires or some of the other Reference features. From the Analysis Map screen turn on the Historical Fires or other feature you wish to use. Click on the "i" tool from the upper tool bar, and select the feature you wish to use. Each feature must be selected one at a time. Under the Info tab select Feature Information. A Selected Feature Information window will pop up. In the center of that window two icons should appear () if these icons do not appear the feature cannot be copied or downloaded. Clicking the first icon that looks like two sheets of paper will copy the feature. Another window pops up, where you will name the new shape and select the shape type, such as Landscape Mask, and click on copy. You may have to refresh your map to have these shapes show up in your map layers legend. If you have created landscape masks they will be available in the Landscape Editor to use. (See *Help>Viewing Feature Information*) Note: this same process can be used to create Management Action Points (MAP) or barriers.
- **Starting an Analysis without a Request:** In the past to obtain a fire behavior analysis it had to be requested through the system for an analyst to begin the work. Now Fire Behavior Specialists and Super Analysts can start an analysis for a fire without a request in the system. To do this the analyst must locate the incident on the Incident Tab, select the incident then select the View Analysis button where they can create an analysis. Note: If assistance with analysis is needed and there is no one available/assigned to do so, it is recommended that a request is put in through the system and you work with your Geographic Area Editor to find an analyst. They will in turn work with the National Fire Decision Support Center (NFDSC) to support the request as necessary.

Fire Behavior Specialist:

- **Recommended Oversight of Analysis (review of work):** Depending upon your experience and comfort level with the analysis tools it is recommended that your work be reviewed by an experienced analyst before accepting it. There is no WFDSS requirement that fire behavior analyses be reviewed before being accepted, but individual Geographic Areas may have implemented local guidance, so check with your Geographical Area Editor to be sure.
- **Considerations before Acceptance of WFDSS Fire Behavior Modeling:** Once a fire behavior run is accepted in WFDSS it becomes part of the permanent record for that incident and is visible for anyone's use. This may cause issues with calibration runs or the wrong runs inadvertently being used for documentation or misinterpreted.

    - **Sharing Analysis –** While calibrating your analysis consider granting others Viewer privileges so they can review the run rather than accepting the run just for review purposes. (See *Help>Granting Analysis Privileges.*) Note: This feature allows those to whom you grant viewer privileges, to view your work for that incident only! A viewer must log-out of WFDSS if logged-in, and log-in once again to refresh privileges.

- **Notes Box (Within the Analysis Screen):** This text box is available within each model input screen under the Menu tab, as well as when the analysis is accepted. Notes should be used to document your thought process and decisions for each step of a fire behavior model run for later reference, or if other analysts need to update your work. Notes may include reasoning for selecting a particular RAWS, how live herbaceous and woody fuel moistures were derived, why the landscape was modified etc. Be sure to include assumptions and caveats in the notes for the final acceptance of the run. With the exception of the final acceptance notes, the Analyst may edit or delete notes on each screen anytime, regardless of the analysis status. This information will be valuable for future Fire Behavior Specialists on the incident, as well as being used to auto-populate a report to document the fire behavior analyses (available by selecting View

Report tab from the Analysis List screen or selecting Report from the left hand Menu in any analysis screen). (See *Help>Creating an Analysis Note.)*

- **Selecting the Correct Model:** When creating an analysis carefully consider the question or questions you are attempting to answer with that analysis and then choose the appropriate modeling system to best answer the question.

    - Basic Fire Behavior (BFB) is a simple way to get "snapshot in time" of potential fire behavior, such as flame lengths and rates of spread. (See the *WFDSS Home Page – Training – Webinars and Other Elearning*.) Reference guides can be found at *WFDSS Home Page>Related Resources>Fire Behavior*.
    - Short Term Fire Behavior (STFB) is a quick way to get an idea of potential fire spread over the next 1 to 3 days. A values inventory is also available based on the STFB analysis. (See *WFDSS Home Page> Training>Webinars and Other Elearning*.) Reference guides can be found at *WFDSS Home Page>Related Resources>Fire Behavior*.
    - Near Term Fire Behavior (NTFB) mentioned above under WFDSS enhancements.
    - Fire Spread Probability (FSPro) This model is helpful for looking at longer range fire potential (more than 5 days). Providing a probability that the fire will reach a point on the landscape within the specified modeled time period, using historical weather observations for a given RAWS and modeling probabilistic scenarios. A Values at Risk assessment can be obtained from the FSPro output. Reference information can be found at *WFDSS Home Page>Related Resources>Fire Behavior*.

Common Problems with WFDSS Fire Behavior Modeling Systems:

- **Fire Won't Spread:**
    - Verify fuel model at ignition point is burnable. Use the "*i*" icon, click on the map at the ignition point. The left pane will change to display the underlying landscape data. Look for *Fuel Model* near the bottom left of the pane.
    - You may also have a resolution problem, if the fire is smaller than the resolution used by the model (e.g., a ¼ acre fire is smaller than a 30-meter landscape cell). Consider using a larger ignition file 2 acres or more. The larger ignition size washes out over the course of the run, assuming it is a fee burning fire. (For more information on resolution and ignition size see *Help>Running a Near-Term Fire Behavior Analysis (NTFB), Recommendations for using NTFB*)
    - Fuel moistures may be set too high, often above moisture of extinction for the fuel model.

- **Model run hangs up, or runs very slow:**
    - Check landscape size. The larger the landscape the greater the computational demand on the computers processor, thus slowing the run progress and tying up server time. Consider a landscape just large enough to contain the area of interest or probable fire spread for the specified modeling period.
    - Setting landscape resolution too fine can also affect processing time. Large landscapes (>20 miles by 20miles) should have a resolution of 90 meters or more, whereas smaller landscapes may use finer resolution to reduce pixilation.
    - Check spotting probability. If the model determines spotting is taking place, the greater the probability you set, the greater the computational demand on the computers processor, slowing the run progress and tying up server time. Consider setting spotting probability with no or limited spotting for calibration. Values of 40% or greater may slow the model run time.
    - If you are using a barrier and an ignition file together, and they intersect at all, it may hang up the model run or cause it to fail. This is a particular problem when using

uploaded fire perimeters as barrier and ignition files. A work around would be to use a mask instead of a barrier, with fuel model set in the mask to a non-burnable fuel such as 99.

- **Insufficient RAWS Data:** Failure messages may appear indicating there is not enough acceptable data to perform a particular function such as a conditioning period. You are able to use the Fire Danger Graph for that particular station to look at the current year line for data gaps. If the nearest station or the station you wish to use does not appear in your choices of RAWS, it may be that that station has a problem with data collection.
- **No RAWS Data Available:** If your burn date or analysis start date is selected and no weather is archived for that day, you often get the following error. *FAILURE: wfdss.framework.exceptions.WFDSSSQLException: ORA-01438: value larger than specified precision allowed for this column*. To fix the issue the analysis start may have to be moved up to the last archived weather.
- **Unable to Retrieve Acceptable Conditioning Data:** NTFB requires weather and wind data that extends one day beyond the last day of the analysis. The reasoning behind this requirement is complex but, essentially, this 'extra day' is used to build a curve for adjusting fine dead fuel moistures on the final burn period. If the dates for the final burn period exceed the available forecast or if there is no 'extra day' available you will get the following message: "*FAILURE: Unable to retrieve acceptable conditioning data for XX/XX/XXXX 00:00"* To fix the problem, delete the last burn period and click 'save' until the failure message no longer appears. Generally you will be limited to 4 or 5 days of analysis for NTFB runs using forecast data (though, in rare cases, it may be possible to get 6 days).
- **Conversion Error:** When using NTFB if you enter a decimal such as 2.5 into the Spot Ignition Delay and attempt to save or run you will get a "*Conversion error occurred*" message. Unlike FARSITE, NTFB will only take a whole integer entry. This error may appear in other WFDSS fire behavior modeling systems.
- **Low Fuel Moistures:** Fuel moistures live or dead of 1% may cause a failed run. Fuel moistures should be 2% or more to prevent failed runs.
- **Heavy Server Usage:** During times of heavy server usage if runs are failing, it may help to log-off and back on. If you realize a calibration run or an analysis is bad, will likely fail, or have excessive run time, please terminate the run, rather than tying up processor time or eventually getting failed run.